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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HYUNJOON LEE, ELYA SHECHTMAN, and JUE WANG¹

Application 13/755,214 Technology Center 2600

Before ALLEN R. MacDONALD, JOHN P. PINKERTON, and GARTH D. BAER, *Administrative Patent Judges*.

MacDONALD, Administrative Patent Judge.

DECISION ON APPEAL

¹ According to Appellants, the real party in interest is Adobe Systems Inc. Appeal Br. 2.

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134(a) from a Final Rejection of claims 1–11 and 21–29. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Exemplary Claims

Exemplary claims 1 and 21 under appeal read as follows (emphasis added):

1. A method implemented by a computing device, the method comprising:

determining, by the computing device and prior to performing a first image adjustment technique, that the first image adjustment technique is unable to correct perspective distortion of the image; and

responsive to determining the first image adjustment technique is unable to correct perspective distortion of the image, determining, by the computing device and prior to performance of a second image adjustment technique, that the second image adjustment technique is able to correct perspective distortion of the image; and

responsive to determining the second image adjustment technique is able to correct perspective distortion of the image, performing, by the computing device, the second image adjustment technique on the image to alter pixels of the image and generate an adjusted image.

21. A system comprising:

one or more computing devices configured to perform operations comprising:

determining, prior to performing a first image adjustment technique, that the first image adjustment technique is unable to correct perspective distortion of the image;

responsive to determining the first image adjustment technique is unable to correct perspective distortion of the image, determining, prior to performance of a second image adjustment technique, that the second image adjustment technique is able to correct perspective distortion of the image and

responsive to the determining the second image adjustment technique is able to correct perspective distortion of the image, performing, by the computing device, the second image adjustment technique on the image to alter pixels of the image and generate an adjusted image.

Rejections on Appeal

- 1. The Examiner rejected claims 1–4, 6, 8, and 21–24 under 35 U.S.C. § 102(b) as being anticipated by Peterson (US 2002/0181802 A1; published Dec. 5, 2002).²
- 2. The Examiner rejected claims 10–11 and 28–29 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Peterson and Baron (US 2003/0016883 A1; published Jan. 23, 2003).

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² The patentability of claims 2 and 22 is not separately argued from that of independent claims 1 and 21. *See* App. Br. 20, 30. Further, although Appellants separately argue the patentability of independent claim 21, the arguments are substantially identical to the arguments for independent claim 1. *See* Appeal Br. 25–30, 52–58. Similarly, although Appellants separately argue the patentability of claims 23–29, the arguments are substantially identical to the respective arguments for claims 3–6, 8, and 10–11. *See* Appeal Br. 30–32, 36–39, and 58–63. Thus, except for our ultimate decision, claims 2 and 21–29 are not discussed further herein.

3. The Examiner rejected claims 1, 4–9, 21, and 24–27 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Lee (US 2011/0243466 A1; published Oct. 6, 2011), Thales Sehn Korting, *C4.5 Algorithm and Multivariate Decision Trees*, Image Processing Division, National Institute for Space Research – INPE, SP, Brazil, 2006 (herein "Korting"), and Peterson.

Appellants' Contentions

1. Appellants contend that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 102(b) because:

Peterson fails to disclose "determining, by the computing device and prior to performing a first image adjustment technique, that the first image adjustment technique is unable to correct perspective distortion of the image" and "responsive to determining the first image adjustment technique is unable to correct perspective distortion of the image, determining, by the computing device and prior to performance of a second image adjustment technique, that the second image adjustment technique is able to correct perspective distortion of the image" as recited in this claim.

. . .

[S]teps 1002, 1004, 1006, 1008, and 1010 of Peterson Fig. 11 do not disclose "a first image adjustment technique" or "a second image adjustment technique." ... Peterson Fig. 11 merely estimates a focal length and rotation angle describing how a camera may have captured the images, and does not in any way adjust the image, and cannot be reasonably interpreted to be multiple "image adjustment techniques."

. . .

[E]ven if the iterative cycle to estimate focal length and rotation angles is considered to be not only an image adjustment technique . . . but also a different image adjustment technique with each iteration . . ., such an interpretation does not disclose "determining, by the computing device and prior to performing a first image adjustment technique, that the first image adjustment technique is unable to correct perspective distortion of the image" and "determining, by the computing device and prior to performance of a second image adjustment technique, that the second image adjustment technique is able to correct perspective distortion of the image" as recited by claim 1. Step 1012 of Peterson Fig. 11 must occur after steps 1002-1010, and not prior to steps 1002-1010.

App. Br. 14, 16–17, Appellants' emphasis omitted, panel's emphasis added.

2. In the Reply Brief, further as to above contention 1, Appellants also contend that the Examiner erred in rejecting claim 1 under

35 U.S.C. § 102(b) because:

[The Examiner's] interpretation of Peterson [that the first version of the parameters and the correction using these parameters can be called a "first adjustment technique" and the second iteration a "second adjustment technique"] is deficient, as the iteration occurs prior to the alleged image adjustment and does not teach "a first image adjustment technique" and "a second image adjustment technique" as claimed.

Reply Br. 6, emphasis added.

3. Appellants also contend that the Examiner erred in rejecting claim 3 under 35 U.S.C. § 102(b) because:

[T]he rotations described by Peterson do not include any identification of any features, and is not used to correct skewing of the image data. Peterson includes no discussion whatsoever that pertains to "upright adjustment," and simply does not disclose, teach, or suggest "the first image adjustment technique includes upright adjustment" as recited by this claim.

App. Br. 21, emphasis added.

- 4. In the Reply Brief, further as to above contention 3, Appellants also contend that the Examiner erred in rejecting claim 3 under 35 U.S.C. § 102(b) because, "[t]he interpretation that 'upright adjustment' refers to anything two-dimensional is *inconsistent with the use of the claim term in the specification and is also inconsistent with the ordinary and customary meaning of the term.*" Reply Br. 7, emphasis added.
- 5. Appellants also contend that the Examiner erred in rejecting claims 4, 6, and 8 under 35 U.S.C. § 102(b) because Peterson includes no discussion whatsoever that pertains to "analyzing edge pixels and line pixels of the image," "analyzing line pixels and vanishing line pixels of the image," and "analyzing vertical and horizontal vanishing lines in the image," and does not disclose, teach, or suggest, "the determining the first image adjustment technique is unable to correct perspective distortion of the image further comprises analyzing edge pixels and line pixels of the image," "determining the first image adjustment technique is unable to correct perspective distortion of the image further comprises analyzing line pixels and vanishing line pixels of the image," and "determining the first image adjustment technique is unable to correct perspective distortion of the image further comprises analyzing vertical and horizontal vanishing lines in the image," as respectively recited by claims 4, 6, and 8. App. Br. 22–24.
- 6. In the Reply Brief, further as to above contention 5, Appellants also contend that the Examiner erred in rejecting claims 4, 6, and 8 under 35 U.S.C. § 102(b) because, "[the interpretation that 'edge pixels,' 'line pixels,' and 'vanishing line pixels' have the same meaning as 'image pixels' is [similarly] inconsistent with the use of the claim terms in the

Application 13/755,214

specification and is also inconsistent with the ordinary and customary meanings of the terms". Reply Br. 7–8, emphasis added.

7. Appellants also contend that the Examiner erred in rejecting claims 10 and 11 under 35 U.S.C. § 103(a) because:

Although Baron describes "rotating the digital representation of the image to reduce the orientation error," Baron does not describe whether or not its technique "is able to correct perspective distortion."

. . .

[T]he Office's stated motivation and reasoning is misplaced and legally insufficient when combining the references[.] . . . The motivation "to include Baron's feature, as taught by Baron" is too general because it could cover any alteration contemplated of Peterson and does not address why the specific proposed modification would have been obvious.

App. Br. 33–34, emphasis added.

8. Appellants contend that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a) because:

The combination of Lee, Korting, and Peterson fails to teach or suggest "determining, by the computing device and prior to performing a first image adjustment technique, that the first image adjustment technique is unable to correct ... distortion of the image" as recited in this claim.

. . .

The Office asserts that a selection of an efficient or optimized (i.e. "maximized") filter from among a plurality of filters is a determination that all [non-maximized] or less efficient filters are outright unable to perform as filters. This interpretation simply is not consistent with the general concepts of efficiency or optimization; just because a choice is not the most efficient or is not the most optimal choice for a function does not mean a less efficient or non-optimal choice is unable to perform the

function. There is simply no basis or support in Lee for such an assertion that unselected filters are unable to perform as filters. Rather, by describing that filter strength should be adaptively adjusted "in order to reduce noise efficiently, and that the selected filter results in "the performance of reducing noise is maximized," Lee implies that using other filters would still reduce noise, just less efficiently or to a lesser degree than the maximized amount achieved by the maximized filter. Thus, Lee does not disclose, teach, or suggest that a first image adjustment technique is unable to correct distortion of the image. Korting and Peterson fail to cure this defect.

. . .

[T]he Office's stated motivation and reasoning is misplaced and legally insufficient when combining the references[.] . . . The motivation "because some images may be distorted more . . . while other images may be distorted less" is too general because it could cover almost any alteration contemplated of Lee and does not address why the specific proposed modification would have been obvious.

App. Br. 39–42, Appellants' citations omitted, panel's emphasis added.

9. In the Reply Brief, further as to above contention 8, Appellants also contend that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a) because:

[Appellants' specification does support that a technique may be unable to perform a correction.] For example, [Appellants'] Specification describes . . . that a technique "may fail at correcting the distortions, and may introduce additional distortions," [and] describes . . . particular examples of "failures encountered using conventional techniques ... such as to align to an image edge that is not the horizon."

Reply Br. 8, Appellants' citations omitted, panel's emphasis added.

10. Appellants contend that the Examiner erred in rejecting claims 4–7 under 35 U.S.C. § 103(a) because the Examiner's interpretation of Lee's

" $h_v(C_{2nd})$ " and " $h_v(C_{max})$ " values as either "edge pixels" and "line pixels," (or vice versa) as recited in claims 4 and 5, or "line pixels" and "vanishing line pixels" (or vice versa) as recited in claims 6 and 7, is contrary to Lee's disclosure, as Lee defines both values to be a number of edge pixels. Appeal Br. 45–49. Thus, as argued by Appellants, Lee fails to disclose, teach, or suggest "determining the first image adjustment technique is unable to correct perspective distortion of the image further comprises analyzing edge pixels and line pixels of the image," as recited in claim 4, "the analyzing is based on a ratio between a number of the edge pixels and a number of the line pixels," as recited in claim 5, "the determining the first image adjustment technique is unable to correct perspective distortion of the image further comprises analyzing line pixels and vanishing line pixels of the image," as recited in claim 6, and "the analyzing is based on a ratio between a number of the line pixels and a number of the vanishing line pixels," as recited in claim 7. Appeal Br. 45–49.

11. In the Reply Brief, further as to above contention 10, Appellants also contend that the Examiner erred in rejecting claims 4–7 under 35 U.S.C. § 103(a) because:

The interpretation that "edge pixels," "line pixels," and "vanishing line pixels" have the same meaning as "image pixels" is inconsistent with the use of the claim terms in the specification and is also inconsistent with the ordinary and customary meanings of the terms. Further, not only are the interpretations that "edge pixels" can be understood as some subtype of "line pixels," and that "vanishing line pixels" can also be understood as some type of "edge pixels," inconsistent with the ordinary and customary meanings of the terms and the use of the claim terms in the specification, but the interpretations are also inconsistent with the use of the term "edge pixel" as described in the reference Lee[.]

Reply Br. 8–9, emphasis added.

12. Appellants contend that the Examiner erred in rejecting claims 8 and 9 under 35 U.S.C. § 103(a) because neither "h_vmag(C_{max})" nor "h_v(C_{max}) are explicitly or inherently described by Lee as vertical or horizontal vanishing lines, Lee fails to support the assertion that a pixel is a line segment and the average size of pixels in an average of line segment lengths, and Lee fails to disclose, teach, or suggest "the determining the first image adjustment technique is unable to correct perspective distortion of the image further comprises analyzing vertical and horizontal vanishing lines in the image," as recited in claim 8, and "the analyzing is based on an average of line segment lengths of the vertical and the horizontal vanishing lines in the image," as recited in claim 9. App. Br. 50–52.

Issues on Appeal

Did the Examiner err in rejecting claims 1, 3, 4, 6, and 8 as being anticipated?

Did the Examiner err in rejecting claims 1 and 4–11 as being obvious?

PRINCIPLES OF LAW

A claim under examination is given its broadest reasonable interpretation consistent with the underlying Specification. *See In re American Acad. of Science Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). In the absence of an express definition of a claim term in the Specification or a clear disclaimer of scope, the claim term is interpreted as broadly as the ordinary usage of the term by one of ordinary skill in the art would permit. *See In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir.

2007); see also In re Morris, 127 F.3d 1048, 1054 (Fed. Cir. 1997). Though understanding the claim language may be aided by explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim. See SuperGuide Corp. v. DirecTV Enters., Inc., 358 F.3d 870, 875 (Fed. Cir. 2004).

The Supreme Court has rejected the rigid requirement of demonstrating a teaching, suggestion, or motivation to combine references in order to show obviousness. *See KSR Int'l Co., v. Teleflex Co.*, 550 U.S. 398, 419 (2007). Instead, a rejection based on obviousness only needs to be supported by "some articulated reasoning with some rational underpinning" to combine known elements in the manner required by the claim. *Id.* at 418.

ANALYSIS

We have reviewed the Examiner's rejections in light of Appellants' arguments that the Examiner has erred. We disagree with Appellants' conclusions. Except as noted herein, we adopt as our own: (1) the findings and reasons set forth by the Examiner in the action from which the appeal is taken (Final Act. 2–13); and (2) the reasons set forth by the Examiner in the Examiner's Answer (Ans. 2–9) in response to the Appellants' Appeal Brief. We concur with the conclusions reached by the Examiner. We highlight the following.

As to Appellants' above contentions 1 and 2 (regarding independent claim 1), we are not persuaded the Examiner erred. We agree with the Examiner that Peterson teaches an "image adjustment technique," as recited in claim 1, as Peterson discloses mapping images using adjustment parameters (i.e., a focal length and rotational angles), where the mapping

produces cylindrical mapped images and reduces perspective distortion within the mapped images. See Ans. 3–4 (citing Peterson ¶ 40; Fig. 4, step 408). We further agree with the Examiner that Peterson also teaches iteratively calculating multiple versions of the adjustment parameters in response to determinations using a previous version of the adjustment parameters to map images will result in significant errors in the mapped images. See Ans. 4 (citing Peterson ¶¶ 81, 83; Fig. 11, steps 1002–1012). The Examiner's interpretation of the claimed "first image adjustment technique" as reading on Peterson's image adjustment technique coupled with an initial set of adjustment parameters and the claimed "second image" adjustment technique" as reading on Peterson's image adjustment technique coupled with a corrected set of adjustment parameters is broad, but reasonable, in light of Appellants' Specification. Neither Appellants' claims, nor Appellants' Specification, provides definitions for a "first image adjustment technique" or a "second image adjustment technique" that distinguish the claim from the cited portions of Peterson. Thus, we affirm the rejection of claim 1 under 35 U.S.C. § 102(b).

As to Appellants' above contentions 3 and 4 (regarding claim 3), we are also not persuaded the Examiner erred. We agree with the Examiner that Peterson teaches adjusting two-dimensional images to correct distortion, including adjusting vertical (i.e., "upright") dimensions. *See* Ans. 6 (citing Peterson ¶ 40; Figs. 3, 5A). The Examiner's interpretation of the claimed "upright adjustment" as reading on Peterson's two-dimensional image adjustment technique is broad, but reasonable, in light of Appellants' Specification. Neither Appellants' claims, nor Appellants' Specification, provides a definition for an "upright adjustment" that distinguishes claim 3

from the cited portion of Peterson. Further, while Appellants' Specification provides examples of upright adjustments (*see, e.g.*, Spec. ¶¶ 26, 29), we decline to import example limitations from the Specification into the claims. Thus, we also affirm the rejection of claim 3 under 35 U.S.C. § 102(b).

As to Appellants' above contentions 5 and 6 (regarding claims 4, 6, and 8), we are also not persuaded of Examiner error. We agree with the Examiner that Peterson teaches analyzing pixels of received images. *See* Ans. 6 (citing Peterson ¶ 39, 44). We further agree with the Examiner that the claimed "edge pixels," "line pixels," and "vanishing line pixels," are merely specific instances of image pixels that represent edges, lines, and vanishing lines, respectively, within the image. *See id.* We do not agree with Appellants' contention that the Examiner interpreted "edge pixels," "line pixels," and "vanishing line pixels" as having the same meaning as image pixels. *See* Reply Br. 7–8. Instead, as correctly found by the Examiner, Peterson generally teaches an analysis of pixels contained within the image, and thus, pixels that represent an edge, line, or vanishing line, would also be analyzed as well. *See* Ans. 6. Thus, we also affirm the rejection of claims 4, 6, and 8 under 35 U.S.C. § 102(b).

As to Appellants' above contention 7 (regarding claims 10 and 11), we are also not persuaded the Examiner erred. We agree with the Examiner that Baron teaches detecting a nearly horizontal or vertical line (i.e., the claimed "visible horizon"), and performing image rotation to align the detected line so that it is horizontal or vertical (i.e., "performing one or more horizon adjustment operations"). *See* Final Act. 6 (citing Baron, Fig. 2, step 205, "YES" branch, step 210); *see also* Ans. 7 (citing Baron, Fig. 2). We further agree with the Examiner that Baron also teaches skipping

performance of the image rotation when an appropriate line is not detected. *See* Final Act. 6 (citing Baron, Fig. 2, step 205 "NO" branch); *see also* Ans. 7 (citing Baron, Fig. 2, step 205). We further disagree with Appellants' contention that the Office Action's stated motivation to combine the cited references of Peterson and Baron is legally insufficient. *See* Appeal Br. 34. Instead, we agree with the Examiner that one of ordinary skill in the art would have been motivated to modify the image mapping taught by Peterson to also further rotate the image to align a detected nearly-horizontal or vertical line so that it is horizontal or vertical, as taught by Baron, to achieve the desired benefit of correcting a tilted horizon line, as also taught by Baron. *See* Final Act. 6; *see also* Baron ¶ 10. Thus, we also affirm the rejection of claims 10 and 11 under 35 U.S.C. § 103(a).

As to Appellants' above contentions 8 and 9 (regarding claim 1), we are also not persuaded of Examiner error. We agree with the Examiner that Lee teaches determining that one of three filtering strengths (i.e., "weak," "light," or "strong") is most efficient in reducing noise in an image, determining that the other two filtering strengths are inefficient in reducing noise, selecting the identified filtering strength, excluding the non-identified filtering strengths from selection, and applying a filtering technique to the image using the selected filtering strength. *See* Final Act. 7 (citing Lee, Table 1). The Examiner's interpretations of the claimed "first image adjustment technique" as reading on Lee's filtering technique coupled with the non-selected filtering strength, and the claimed "second image adjustment technique" as reading on Lee's filtering technique coupled with the selected filtering strength, are broad, but reasonable, in light of Appellants' Specification. Neither Appellants' claims, nor Appellants'

Specification, provides definitions for a "first image adjustment technique" or a "second image adjustment technique" that distinguish the claim from the cited portions of Lee.

We further disagree with Appellants' contention that the Office Action's stated motivation to combine the cited references of Lee and Peterson is legally insufficient. *See* Appeal Br. 41. Instead, we agree with the Examiner that one of ordinary skill in the art would have been motivated to modify the image filtering technique taught by Lee to also include the perspective distortion correction taught by Peterson, to achieve the desired benefit of correcting perspective distortion caused by altering an image, as also taught by Peterson. *See* Final Act. 8; *see also* Peterson ¶ 32. Thus, we also affirm the rejection of claim 11 under 35 U.S.C. § 103(a).

As to Appellants' above contentions 10 and 11 (regarding claims 4–7), we are also not persuaded the Examiner erred. We agree with the Examiner that Lee teaches analyzing edge pixels. *See* Final Act. 9–10 (citing Lee ¶ 64). We further agree with the Examiner that Lee's edge pixels teach or suggest the claimed "line pixels," and "vanishing line pixels," because specific instances of an edge can include a line or a vanishing line. *See* Ans. 8. We do not agree with Appellants' contention that the Examiner's finding is inconsistent with Lee's use of the term "edge pixel," because paragraph 32 of Lee merely describes that edge pixels belong to an edge (i.e., block boundary), and, as previously described, a specific instance of an edge can be a line or a vanishing line. *See* Lee ¶ 32. Thus, we also affirm the rejection of claims 4–7 under 35 U.S.C. § 103(a).

As to Appellants' above contention 12 (regarding claims 8–9), we are also not persuaded of Examiner error for the reasons previously discussed

above with respect to Appellants' above contentions 10 and 11. With respect to Appellants' argument that Lee fails to teach or suggest that a pixel is a line segment and the average size of pixels is an average of line segment lengths (*see* Appeal Br. 52), we agree with the Examiner that "wherein the analyzing is based on an average of line segment lengths," as recited in claim 9, would have been obvious to one of ordinary skill in the art in light of Lee's teaching of analyzing edge pixels based on an average size of edge pixels. *See* Final Act. 11 (citing Lee ¶ 67). Thus, we also affirm the rejection of claims 8 and 9 under 35 U.S.C. § 103(a).

CONCLUSIONS

- (1) The Examiner has not erred in rejecting claims 1–4, 6, 8, and 21–24 as being anticipated under 35 U.S.C. § 102(b).
- (2) The Examiner has not erred in rejecting claims 1, 4–11, 21, and 24–29 as being unpatentable under 35 U.S.C. § 103(a).
 - (3) Claims 1–11 and 21–29 are not patentable.

DECISION

We affirm the Examiner's rejections of claims 1–4, 6, 8, and 21–24 as being anticipated under 35 U.S.C. § 102(b).

We affirm the Examiner's rejections of claims 1, 4–11, 21, and 24–29 as being unpatentable under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED³

³ As the Examiner has shown that all the claims are unpatentable, we do not also reject Appellants' claims 21–29 under 35 U.S.C. § 112, second paragraph as being indefinite; and claims 21–29 under 35 U.S.C. § 112, first paragraph as lacking an enabling disclosure commensurate with the scope of the claims. However, should there be further prosecution of these claims; the Examiner's attention is directed to our following concerns.

- (a) With respect to claims 21–29 and § 112, second paragraph, it is unclear whether Appellants intend claim 21 to encompass "one computing device" (i.e., a single means) for the two determining functions and the performing function (and thus, outside the coverage of § 112, sixth paragraph); or is the claim to be read as separate "computing devices" for each of the two determining functions and the performing function (and thus, within the coverage of § 112, sixth paragraph).
- (b) Further, if Appellants intend claim 21 to encompass "one computing device" (i.e., a single means) for the two determining functions and the performing function, then as a single means claim, claim 21 fails under 35 U.S.C. § 112, first paragraph, as lacking an enabling disclosure. See MPEP § 2164.08(a).
- (c) Alternatively, if Appellants intend claim 21 to be read as separate "computing devices" for each of the two determining functions and the performing function, then claim 21 may fail under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner's attention is directed to *Aristocrat Techs. Australia Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328 (Fed. Cir. 2008); and MPEP 2181 (*e.g.*, 2181 I.A.). Merely labeling the device as a "computing" device is unlikely to result in the claimed device being recognized by one of ordinary skill in the art as being sufficiently definite structure for performing the claimed function.